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# PATENT SPECIFICATION

DRAWINGS ATTACHED

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## COMPLETE SPECIFICATION

### Crutch Tip

I, ALFRED A. SMITH, of 3030 East Olympic Boulevard, Los Angeles, California, United States of America; a citizen of the United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The present invention concerns a crutch tip which is capable of bending in any direction as the crutch pivots, without such bending causing the base of the crutch tip to become unseated from the ground. The crutch tip comprises a base, with a neck disposed above the base. The neck and base are separated by an annular groove or otherwise clearly defined line of bending movement of the neck with respect to the base.

It is an object of the present invention to provide an improved crutch tip having one or more vertically directed longitudinal ribs which intersect the groove at right angles and reinforce it in order to snub the bending movement of the neck with respect to the base and prevent a sudden or extreme bending movement which is particularly likely to occur at the beginning of the forward movement when the crutch tip first engages the ground. The longitudinal ribs also act to accelerate the return movement of the crutch tip to its normal position when it is no longer under tension.

With the crutch tip construction shown and described in the present application, the line of bending movement of the neck with respect to the base is relatively clearly defined. This is essential in order that the crutch tip will always flex along a fixed horizontal axis when it is subjected to pressure from the crutch shaft. At the same time, however, the bending movement of the neck away from its normal position is snubbed by the reinforcing action of the longitudinal ribs in order to

avoid too rapid yielding which results in a considerable "snap action" by the crutch base against the ground. This is likely to occur when the crutch tip is initially brought into engagement with the ground on the forward movement of the crutches, the crutch shaft then being disposed at substantially its maximum angular deviation from normal. If the bending action of the neck with respect to the base is too rapid, there is an immediate "give" which imparts to the crutch user a feeling of uncertain crutch footing. This action and feeling are avoided if the bending movement is slowed or snubbed so that the crutch base moves more slowly and evenly into ground engaging position.

The desired slowing or snubbing action is obtained through the longitudinal ribs which intersect the annular groove to reinforce it at spaced points around the crutch tip without interfering with the functioning of the groove in providing a clearly defined axis of bending movement.

When the crutch is lifted from the ground, the longitudinal ribs act to accelerate the return movement of the crutch tip to its normal position before it engages the ground again on the next forward movement of the crutch.

It is accordingly an object of the invention to provide a new and improved crutch tip having all of the advantages and benefits of the structure set forth above and described in further detail hereinafter in this application. It is also among the objects of the invention to provide such a crutch tip which is capable of being molded from a single piece of resilient material, such as rubber or the like.

According to the present invention a crutch tip comprises a base, a neck disposed above the base, the neck having a hollow crutch shaft receiving passage therein, the neck having a line of bending movement with respect

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to the base, and means reinforcing one or more portions of the line of bending movement to snub the flexing movement of the neck and base with respect to each other.

5 The reinforcing means preferably intersects one or more portions of the line of bending movement. The walls of the crutch tip are preferably thinner along the line of bending movement than along the adjacent portions  
10 of the crutch tip and the reinforcing means preferably comprises thickening one or more portions of such thinner walls.

The line of bending movement may comprise an annular groove surrounding the neck adjacent the top of the base. The reinforcing means may comprise one or more longitudinal ribs intersecting the line of bending movement. Such longitudinal ribs conveniently extend at a right angle to the line of bending movement. Such longitudinal ribs may be  
20 formed integrally with the neck and base.

Four equidistantly spaced longitudinal ribs may be provided.

The line of bending movement is preferably disposed a substantial distance above the  
25 bottom of the passage.

The lower end of the passage may be outwardly enlarged to provide a free area which is adapted to permit movement of the lower  
30 end of a crutch shaft within the passage when the neck is flexed.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:—

35 Fig. 1 is an isometric view of a preferred form of crutch tip in accordance with the invention:

Fig. 2 is a transverse sectional view of the same, taken along line 2—2 of Fig. 1;

40 Fig. 3 is a longitudinal sectional view of the same, taken along lines 3—3 of Fig. 2; and

Fig. 4 is a sectional view similar to Fig. 3, showing the crutch tip in use on the end  
45 of a crutch shaft.

A preferred embodiment which has been selected to illustrate the invention comprises a crutch tip 10, which is preferably moulded of a single piece of rubber or other suitable resilient material. The crutch tip 10 has a  
50 thick circular base 11 at the bottom, above which is an integrally formed elongated neck 12. Between the neck 12 and base 11, the crutch tip 10 is provided with an annular groove 13, which defines the horizontal axis of bending movement of the neck 12 with  
55 respect to the base 11.

The inside of the crutch tip 10 is provided with an elongated substantially cylindrical hollow crutch shaft receiving passage  
60 14, the upper walls of which are provided with alternating lands 15 and grooves 16, which provide a secure grip around the bottom portion of the cylindrical crutch shaft 17.

65 The passage 14 has a flat circular bottom

18, upon which may be mounted a circular metal disc 22, which acts to reduce the frictional wear of the end of the crutch shaft 17 on the passage bottom 18. The bottom 18 of the passage 14 is disposed within the base 10 and is disposed substantially beneath the groove 13.

The bottom 18 is substantially larger in diameter than the adjacent portion of the passage 14 disposed thereabove, the walls of the passage 14 tapering inwardly from the bottom 18 to form a substantially frusto-conical free area 19, which is somewhat larger in diameter than the portion of the crutch shaft 17 which is disposed therein.

The free area 19 extends into the upper portion of the base 11 and is disposed beneath the groove 13, so that the lower end of the crutch shaft 17 is free to pivot to an angular position within the passage 14 without substantial interference from the walls of the passage 14. This reduces the unseating force directed by the crutch shaft 17 against the tip 10.

The side walls of the crutch tip 10 are somewhat thinner along the horizontal axis of the groove 13 than along the portions adjacent thereto, so that the groove 13 defines the axis along which the neck 12 naturally tends to flex with respect to the base 11,  
95 in response to angular force from the crutch shaft 17 when the tip is in use.

The outside of the crutch tip 10 is provided with four vertical longitudinally directed ribs, 20 which are formed integrally and which are equidistantly spaced around the crutch tip 10. The lower ends of the longitudinal ribs 20 merge into the top of the base 11, while their upper ends terminate somewhat short of the top of the crutch tip 10. All of the longitudinal ribs 20 intersect the annular groove 13 at a right angle.

The bottom of the base 11 is provided with a plurality of concentric circular grooves 21, which act to improve the grip of the base 11 upon the ground.

In use, when the edge of the base 11 is first brought into engagement with the ground upon the forward movement of the crutch, the crutch shaft 17 is disposed at an angle with respect to the ground and the crutch tip 10 will flex along the axis defined by the annular groove 13 to move the bottom of the base 11 flat upon the ground while the neck 12 remain in an angular position. The longitudinal ribs 20 act to slow or snub the flexing of the base 11 with respect to the neck 12 so that the bending movement will be smooth and will not impart a feeling of sudden "give" to the user.

The free area 19 co-operates by reducing the amount of flexing required of the crutch tip. It permits the crutch tip 10 to assume a somewhat less angular position than that of the crutch shaft 17. When the crutch  
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shaft 17 pivots over to the opposite angular position, the free area 19 acts to reduce the unseating force exerted by the crutch shaft 17 against the inner walls of the crutch shaft receiving passage 14.

When the crutch is lifted from the ground, the longitudinal ribs 20 accelerate the return movement of the neck 12 and base 11 to their normal positions in preparation for the next crutch swing.

In the specification of my prior patent No. 874,724 I have described and claimed a crutch tip comprising a base, a neck disposed above the base, the neck having a hollow crutch shaft receiving passage therein, the neck having a single line of bending movement with respect to the base, the line being disposed a substantial distance above the bottom of the base. The preferred embodiment of my present invention, as described above with reference to the accompanying drawings, falls within the scope of my said prior patent; but it is to be understood that the present invention is not to be considered as being limited either to the preferred embodiment as aforesaid or to any form of construction which incorporate the invention of my said prior patent.

#### WHAT I CLAIM IS:—

1. A crutch tip comprising a base, a neck disposed above the base, the neck having a hollow crutch shaft receiving passage therein, the neck having a line of bending movement with respect to the base, and means reinforcing one or more portions of the line of bending movement to snub the flexing movement of the neck and base with respect to each other.

2. A crutch tip as claimed in claim 1, in which the reinforcing means intersects one or more portions of the line of bending movement.

3. A crutch tip as claimed in claim 1 or 2, in which the walls of the crutch tip are thinner along the line of bending movement than along the adjacent portions of the crutch tip and the reinforcing means comprises thickening one or more portions of such thinner walls.

4. A crutch tip as claimed in any of the preceding claims, in which the line of bending movement comprises an annular groove surrounding the neck adjacent the top of the base.

5. A crutch tip as claimed in any of the preceding claims, in which the reinforcing means comprises one or more longitudinal ribs intersecting the line of bending movement.

6. A crutch tip as claimed in claim 5, in which the longitudinal ribs extend at a right angle to the line of bending movement.

7. A crutch tip as claimed in claims 5 and 6, in which the longitudinal ribs are formed integrally with the neck and base.

8. A crutch tip as claimed in claim 5, 6 or 7, in which there are four equidistantly spaced longitudinal ribs.

9. A crutch tip as claimed in any of the preceding claims, in which the line of bending movement is disposed a substantial distance above the bottom of the passage.

10. A crutch tip as claimed in any of the preceding claims in which the lower end of the passage is outwardly enlarged to provide a free area which is adapted to permit movement of the lower end of a crutch shaft within the passage when the neck is flexed.

11. A crutch tip constructed and arranged substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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FIG. 1.

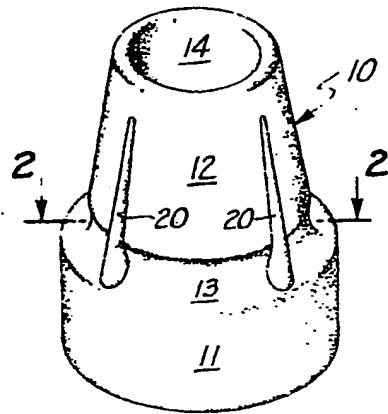


FIG. 2.

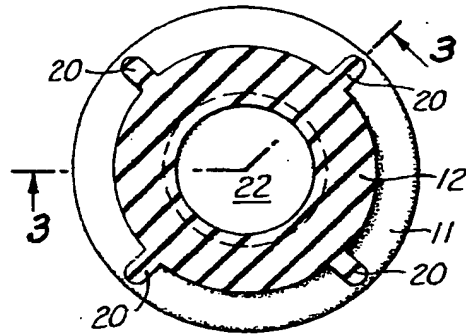


FIG. 3.

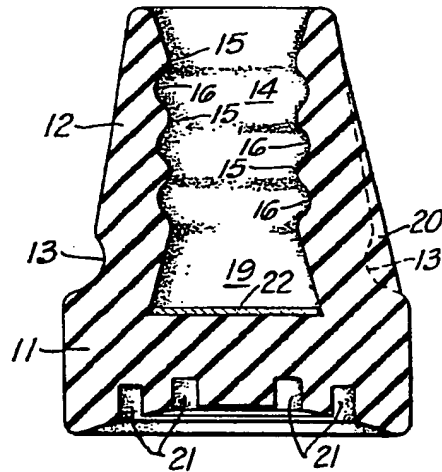


FIG. 4.

